[0078] By gently press the rubber plate from Example 2 on coated glass slide, patterned spacers were transferred onto the glass slide as shown on the FIG.11.

[0079]. This invention has been described with reference to its preferred embodiments. Variations and modifications of the invention described herein will be obvious to those skilled in the art from the foregoing detailed description of the invention. It is intended that all of these variations and modifications be included within the scope of the appended claims.

I claim:

1.A method for placing spacer uniformly and securely onto the substrate of a liquid crystal display element, comprising the steps of:

(a). Preparing an UV [or thermal] curable resin containing spacer particles.

(b) Dispersing certain amount of above spacer-resin mixture on a gravure cylinder with well finished designed cells to be used as the spacer-resin carrier.

(c) Removing excess spacer-resin mixture and forced spacer particle with resin into each hole by means of doctor knife.

(d) Transferring individual spacer-resin onto a second smooth surfaced roller according to the designed pattern by means of contact.

(e) Transferring individual patterned spacer –resin onto the surface of substrate of a liquid crystal display element from the second roller with any conventional coating methods.

2. A spacer-resin composition in part (a ) of claim 1 is comprising:

(a) An uniform size of spacer particles, either made of plastic or glass. The shape of spacer particles can be spherical or rod-like.

(b) UV or thermal curable (meth)acrylated oligomers.

(c) Vinyl monomers or (meth)acrylate monomers.

(d) Photo-initiators or thermal-initiators.

(e) Additives.

3. The additives in part (e) of claim 2 can be dispersants, surfactants, antioxidants, light - stabilizers and coating aids which aiding dispersing ability of spacer particles during mixing or impart other desirable properties to the spacer-resin mixture.

4. The gravure roller used in part (b) of claim 1 should made of hydrophobic, non-adhesive layer with thickness greater than twice of the diameter of the spacer particles.

5. The hydrophobic, non-adhesive layer in claim 4 is Teflon.

6. The hydrophobic, non-adhesive layer in claim 4 is a low surface energy fluorinated polymer.

7. The size of the hole in part (b) of claim 1 has an opening diameter and the depth both at 105-195% of the diameter of the spacer particle.

8. The gravure roller used in part (b) of claim 1 can be engraved the metal cylinder first, then coated with a thin layer of hydrophobic, non-adhesive coating.

9. The hydrophobic, non-adhesive thin layer in claim 8 is Teflon.

10.The hydrophobic, non-adhesive thin layer in claim 8 is a low surface energy fluorinated polymer.

11. A method for placing sealant uniformly and securely onto the substrate of a liquid crystal display element, comprising the steps of:

(a) Preparing an UV (or thermal) curable sealant containing spacer particles.

(b) Dispersing certain amount of above spacer-sealant mixture on a gravure cylinder with channel-like design pattern to be used as the spacer-sealant carrier.

(c) Removing excess spacer-sealant mixture and forced correct amount of spacer-sealant mixture into the channel.

(d) Transferring a strip of spacer-sealant mixture onto a second smooth surfaced roller according to the designed pattern by means of contact.

(e) Transferring the patterned spacer-sealant strip onto the surface of substrate of a liquid crystal display element from the second roller with any conventional coating methods.

12. An adhesive spacer-sealant composition in part (a) of claim 11 is comprising:

(a) An uniform size of spacer particles, either made of plastic or glass. The shape of spacer particles can be spherical or rod-like.

(b) UV or thermal curable (meth)acrylated oligomers.

(c) Vinyl monomers or (meth)acrylate monomers.

(d) An epoxy (meth)acrylates.

(e) Photo-initiators or thermal initiators.

(f) Additives.

13. The additives in part (f) of claim 12 can be dispersants, surfactants, antioxidants, light-stabilizers and coating aids which aiding dispersing ability of spacer particles during mixing or impart other desirable properties to the spacer-sealant mixture.

14. The gravure roller used in part (b) of claim 11 should made of hydrophobic, non-adhesive layer with thickness of greater than twice of the diameter of the spacer particles.

15. The hydrophobic, non-adhesive layer in claim 14 is Teflon.

16. The hydrophobic, non-adhesive layer in claim 14 is a low surface energy fluorinated polymer.

17. The depth of the channel in part (b) of claim 11 is about 105-195% of the diameter of the spacer particle.

18. The gravure roller used in part (b) of claim 11 can be engraved the metal cylinder first, then coated with a thin layer of hydrophobic, non-adhesive coating.

19. The hydrophobic, non-adhesive thin layer in claim 18 is Teflon.

20. The hydrophobic, non-adhesive thin layer in claim 18 is a low surface energy fluorinated polymer.

21. A method to bond two coated substrates to form a liquid crystal display device by radiation energies.

22. The radiation energy in claim 21 is ultra-violet radiation energy.

23. The radiation energy in claim 21 is thermal radiation energy.

24. The coated substrate in claim 21 is the substrate coated with spacer-resin as in claim 1.

25. The other coated substrate in claim 21 is the substrate coated with spacer-sealant as in claim 11.